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Research Note

Subcutaneous Helminths of the Raccoon (*Procyon lotor*) in Southern Florida

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ABSTRACT: Examination of the subcutaneous tissues of 54 raccoons (*Procyon lotor*) from southern Florida revealed the presence of spargana of 1 cestode, *Spirometra mansonoides* (prevalence 40.7%), and adults of 3 species of nematodes, *Dracunculus insignis*, *Dirofilaria tenuis*, and *Dipetalonema procyonis* (prevalences 16.7, 14.8, and 1.9%, respectively).

KEY WORDS: Cestoda, *Spirometra mansonoides*, Nematoda, *Dracunculus insignis*, *Dirofilaria tenuis*, *Dipetalonema procyonis*, raccoon, *Procyon lotor*, Florida.

The raccoon, *Procyon lotor*, is distributed throughout southern Canada, the continental United States, Mexico, and Central America. Previous studies on the parasite fauna of this mammal throughout its range have resulted in some helminthological information for raccoons in Florida (Harkema and Miller, 1964; Schaffer et al., 1981; Telford and Forrester, 1991; Forres-

Table 1. Prevalence and intensity of subcutaneous helminths of 54 raccoons in southern Florida, 1990–1991.

| Species of helminth | Prevalence | | Intensity | |
|-------------------------------|--------------|------|-----------|-------|
| | No. infected | % | \bar{x} | Range |
| <i>Spirometra mansonoides</i> | 22 | 40.7 | 3.9 | 1–16 |
| <i>Dracunculus insignis</i> | 9 | 16.7 | 1.0 | — |
| <i>Dirofilaria tenuis</i> | 8 | 14.8 | 2.3 | 1–4 |
| <i>Dipetalonema procyonis</i> | 1 | 1.9 | 1.0 | — |

ter, 1992). The incidental discovery of infections of *Dracunculus insignis* in 2 endangered Florida panthers (*Felis concolor coryi*) in 1989–1990 (Forrester, 1992) triggered an interest in the subcutaneous parasites of raccoons in southern Florida since this parasite has been found in raccoons in other parts of the southeastern United States (Harkema and Miller, 1964; Schaffer et al., 1981). The carcasses of 54 raccoons collected for an environmental contaminant study (Roelke et al., 1991) within Florida panther habitat became available for study. The purpose of this report is to describe the prevalence and intensity of the subcutaneous helminths in these raccoons.

The raccoons were collected between April 1990 and March 1991 from Collier ($N = 16$), Dade ($N = 25$), and Monroe ($N = 13$) counties. Forty (85%) of the raccoons were obtained during March to June, 6 in October, and 1 each in January and February. Complete necropsies were performed including examination of the subcutaneous tissues of the skinned carcasses. Helminths were teased out of the tissues with forceps. Nematodes were fixed and preserved in 70% glycerine–alcohol and later were mounted in lactophenol for identification. The cestodes were fixed and preserved in AFA solution. A sample of skin and subcutaneous tissue from 1 raccoon with a lesion on its forelimb was fixed in 10% neutral buffered formalin, sectioned at 6 μ m, and stained with hematoxylin–eosin using standard procedures. Representative specimens were deposited in the U.S. National Parasite Collection (Beltsville, Maryland 20705): *Dracunculus insignis* (male), USNM Helm. Coll. No. 82195; *Dracunculus insignis* (female), No. 82196; *Dirofilaria tenuis* (female), No. 82197; *Dirofilaria tenuis* (male), No. 82198; *Dipetalonema procyonis* (female), No. 82199; and *Spirometra mansonoides* (sparganum), No. 82200.

Prevalence and intensity for each species of helminth found are given in Table 1.

Spirometra mansonoides occurs commonly in

bobcats (*Felis rufus*) and Florida panthers in Florida (Forrester et al., 1985; Forrester, 1992). The raccoon may be a source of infection for these felids, especially the Florida panther, since part of their diets consists of raccoons (Maehr and Brady, 1986; Maehr et al., 1990).

In other areas, the prevalence of *Dracunculus insignis* in raccoons has been observed to be higher than found in the present study. Prevalences varying from 50 to 83% were reported in raccoons from Virginia, Texas, and Ontario (Chandler, 1942; Crichton and Beverley-Burton, 1977; Schaffer et al., 1981). These differences may have been due to variations in food habits and the season of the year when samples were obtained.

The prevalence of *Dirofilaria tenuis* was lower than has been reported previously for the same geographic region by Isaza and Courtney (1988), i.e., 15 vs. 45%. In the present study, prevalences were determined by locating adults in subcutaneous tissues, whereas Isaza and Courtney (1988) used the presence of microfilariae in the peripheral blood as their criterion for infection. Our technique may have resulted in an underestimation of the actual prevalence.

Mansonella llewellyni, a subcutaneous nematode found in previous raccoon studies in Florida (Telford and Forrester, 1991), was not observed in this study. Telford and Forrester (1991) stated that there was a north to south decrease in the prevalence of *M. llewellyni* (50 and 79% in 2 groups of raccoons from Duval County in northern Florida, and 5% in Hillsborough County in central Florida). The absence of the parasite in animals examined in the present study in southern Florida provides additional evidence that such a southerly decline exists.

In all but 1 case, the presence of subcutaneous helminths did not cause grossly obvious lesions, indicating that infections with these helminths at the intensities observed may not be detrimental to the host. The single lesion found on the

forelimb of 1 raccoon appeared to contain a dead, mineralized specimen of *Dracunculus insignis*. When examined by histopathology, deep dermal and subcutaneous inflammation and fibrosis were found to be present surrounding small mineralized foci. This is consistent with the description given by Crichton and Beverley-Burton (1977) of the inflammation occurring during absorption of a dead *D. insignis* following its larvigerous stage.

These helminth infections in southern Florida may be more significant as zoonoses than as disease problems in wildlife. *Dirofilaria tenuis*, for example, has been reported to cause subcutaneous and conjunctival nodules in humans. These human infections are especially common in southern Florida and are associated with high prevalences of infected raccoons (Isaza and Courtney, 1988).

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